

1964

**SHORT-FORM CATALOG OF
TRANSISTOR DEVICES**

FERROTRAN ELECTRONICS CO., INC.

POWER SUPPLY MODULES

- **AUDIO AMPLIFIERS
and SYSTEMS**
- **I-F AMPLIFIERS**
- **TRANSFORMERS**



POWERTRAN POWER SUPPLY MODULES

TUBELESS • SHORT-CIRCUIT PROTECTED • MINIATURE REGULATED D.C. POWER SUPPLIES

Powertran miniature regulated power supply modules, the smallest units of their type, provide an ungrounded constant D.C. output and are suitable for chassis mounting. Perfect for bias,

filament or transistor power source, D.C. reference voltage, missile applications, telemetry circuitry, and in test equipment.

ELECTRICAL FEATURES

NOMINAL INPUT VOLTAGE—115 Volts
INPUT VOLTAGE RANGE—105 to 130 Volts
INPUT FREQUENCY RANGE—50 to 400 cycles
TRANSIENT INPUT—300 Volt pulse may be applied to primary with no damage to unit.
MAXIMUM A.C. INPUT VOLTS—140 Volts
SHORT-CIRCUIT PROTECTION—A direct short circuit applied to output terminals will not damage the unit.
2000-CYCLE INPUT—115 V., 2000-cycle input available for these units.
WARM-UP TIME—None. Fully operable on turn-on.
TEMPERATURE (storage)—(-)54°C. to +85°C.
TEMPERATURE (operating)—(-)30°C. to +70°C.
COMPONENTS—All components are rated for a minimum +85°C.
POLARITY—Outputs are floating; may be used positively or negatively.
REGULATION—Specified as no-load to full-load.
RIPPLE—Specified at 60 cy. To obtain the approx. ripple at 400 cy., divide the 60 cy. ripple by 6.

MECHANICAL FEATURES

SHOCK—70 G.
VIBRATION—2G from 12 cps to 250 cps, in 3 planes.
HUMIDITY—95% for two hours.
CASE—Will meet MIL-T-27 specifications.
CONNECTOR—Compression type multi-lead glass headers. (Former type terminals or octal or heptal plug-in types may be specified at no extra charge.)
FINISH—Light grey Alkyd base enamel; chip-proof, high gloss.
NAMEPLATE—Metal foil decal. Completely identifies model and rating.
HEAT-SINKS—Internal for all units.
MOUNTING—Chassis mounted with four threaded studs.
MARKING—All terminals marked with pin numbers and identification.

GUARANTEED FOR 3 YEARS OF CONTINUOUS OPERATION

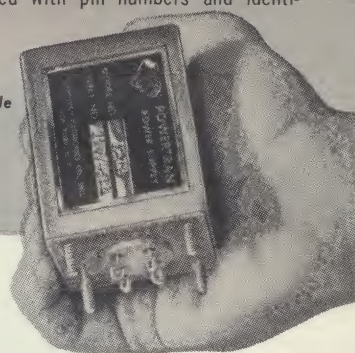
MIDGET MODULE SERIES

EB CASE—1 3/4" x 1 7/8" x 2 3/8"

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
M-3	3.	50 ma.	2.0	.40	\$37
M-4	4.	50	2.0	.40	37
M-5	5.	50	2.0	.30	37
M-6	6.	50	2.0	.30	35
M-7	7.	50	2.0	.30	37
M-8	8.	50	2.0	.25	37
M-9	9.	50	2.0	.20	37
M-10	10.	50	1.5	.20	35
M-12	12.	45	1.5	.15	35
M-15	15.	45	1.5	.15	37



M-30 Midget Module



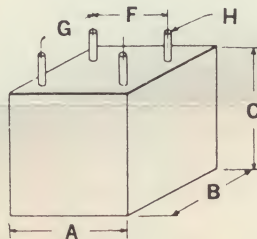
M12 Midget Module

M-18	18.	45	2.0	.25	38
M-20	20.	45	1.5	.20	38
M-22	22.	45	1.5	.20	38
M-24	24.	40	2.0	.15	38
M-25	25.	40	2.0	.15	38
M-27	27.	40	1.5	.15	38
M-28	28.	40	1.5	.15	38
M-30	30.	40	1.75	.17	38
M-35	35.	35	2.0	.30	40
M-40	40.	35	2.0	.30	40

INTERMEDIATE SERIES

HM MODULES—FB CASE, 2 1/8" x 2" x 2 1/2". Extremely low ripple units ideal for operational amplifier.

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
HM-5	5.	50 ma.	1.5	.10	\$42
HM-6	6.	50	1.5	.10	42
HM-10	10.	55	1.0	.05	42
HM-12	12.	55	1.0	.05	42
HM-15	15.	50	1.0	.08	42
HM-20	20.	50	1.5	.10	42
HM-24	24.	45	1.5	.10	44
HM-28	28.	45	1.5	.10	44
HM-30	30.	45	1.5	.10	44



DIMENSIONS PER MIL-T-27A

Case	A	B	C	F	G	H
AH	1 3/4	1 3/8	1 3/4	1 1/4	—	6-32x3/8
AJ	1 3/8	1 5/8	2 3/8	1 3/4	1 3/4	6-32x3/8
EB	1 3/8	1 3/8	2 1/4	1 3/8	1 1/4	6-32x3/8
FB	2 3/8	2 1/8	2 1/2	1 1/8	1 7/8	6-32x3/8
GA	2 3/4	2 3/8	3 1/8	2 1/8	1 3/4	6-32x3/8
GB	2 3/4	2 3/8	2 1/8	2 1/8	1 3/4	6-32x3/8
HA	3 1/8	2 5/8	4 1/4	2 1/4	1 3/4	8-32x3/8
HB	3 1/8	2 5/8	3 3/8	2 1/4	1 3/4	8-32x3/8
JA	3 1/8	3 1/8	4 7/8	2 5/8	2 1/8	8-32x3/8
JB	3 1/8	3 1/8	3 7/8	2 5/8	2 1/8	8-32x3/8
KA	3 1/8	3 3/8	5 1/4	3	2 1/4	10-32x1/2
LA	4 3/8	3 1/8	5 1/8	3 3/8	2 1/4	10-32x1/2
YY	1 3/4	1 5/8	1 5/8	1 1/2	1 1/8	6-32x3/8

MEDIUM CURRENT SERIES

MC MODULES—HB CASE, 2 1/2" x 3" x 3 1/8".

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
MC-7	7.	175	1.5	.20	\$55
MC-8	8.	175	1.5	.20	55
MC-9	9.	175	1.5	.20	50
MC-10	10.	175	1.5	.20	55
MC-11	11.	160	1.4	.20	50
MC-12	12.	150	1.2	.10	55
MC-15	15.	140	1.2	.20	55
MC-18	18.	140	1.5	.15	55
MC-20	20.	140	1.0	.20	55
MC-22	22.	125	1.0	.20	50
MC-24	24.	125	1.0	.15	55
MC-26	26.	125	1.0	.15	50
MC-27	27.	125	1.0	.15	55
MC-28	28.	125	1.0	.10	55

MCH MODULES—JB CASE, 3 1/2" x 3" x 3 7/8".

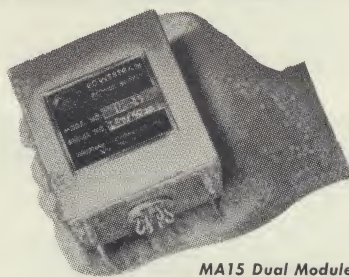
Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
MCH-7	7.	300	2.5	.6	\$60
MCH-8	8.	300	2.5	.6	60
MCH-9	9.	300	2.5	.6	60
MCH-10	10.	300	2.0	.4	60
MCH-12	12.	280	2.0	.5	60
MCH-15	15.	280	2.0	.5	60
MCH-18	18.	250	2.0	.5	60
MCH-20	20.	250	2.0	.5	60
MCH-22	22.	250	2.0	.5	60
MCH-24	24.	225	2.0	.5	60
MCH-26	26.	225	2.0	.3	60
MCH-27	27.	200	2.0	.3	60
MCH-28	28.	200	2.0	.3	60

GB CASE, 2 3/4" x 2 3/8" x 2 3/4".

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
MA-3	3.3V	55 ma.	2.0	.40	\$50
MA-4	4.4	55	2.0	.40	50
MA-5	5.5	55	2.0	.30	50
MA-6	6.6	55	2.0	.30	50
MA-7	7.7	55	1.5	.20	50
MA-8	8.8	55	1.5	.15	50
MA-9	9.9	55	1.5	.15	50
MA-10	10.10	55	1.5	.15	50
MA-12	12.12	55	1.5	.15	50
MA-15	15.15	50	1.5	.20	50
MA-18	18.18	50	1.5	.15	55
MA-20	20.20	50	1.5	.15	55
MA-22	22.22	45	1.5	.15	55
MA-24	24.24	40	1.5	.10	55
MA-25	25.25	40	1.5	.10	55
MA-27	27.27	40	1.5	.10	55
MA-28	28.28	40	1.8	.10	55
MA-30	30.30	35	1.8	.15	60
MA-515	5.15	50	1.5	.25	55
MA-712	7.12	50	1.5	.30	55
MA-122	12.24	40	1.5	.40	60

DUAL OUTPUT POWER SUPPLY MODULES

These transistor power supply modules contain two independent units, giving two DC output voltages which are not grounded to the case nor electrically connected to each other. They supply two positive voltages, two negative voltages, or a positive or negative voltage.



MA15 Dual Module

GB CASE, 2 3/4" x 2 3/8" x 2 3/4".

Dual Output Units with extremely low ripple factor. Excellent for operational amplifiers.

MM-10	10.10	60	1.0	.05	\$60
MM-12	12.12	60	1.0	.05	60
MM-15	15.15	55	1.0	.006	60

HB CASE, 2 1/2" x 3" x 3 7/8".

MM-20	20.20	45	1.2	.05	\$65
MM-24	24.24	45	1.2	.05	65
MM-28	28.28	45	1.4	.05	65
B-224	22 1/2, 45	50	1.5	.30	65
B-456	45, 67 1/2	40	1.5	.30	65

JB CASE, 3 1/2" x 3" x 3 7/8".

HMJ-10	{ 10	50	1.5	.15	\$85
	{ 10	250	2.0	.25	
HMJ-12	{ 12	50	1.5	.15	85
	{ 12	250	2.0	.25	
HMJ-15	{ 15	50	1.5	.15	85
	{ 15	200	2.0	.25	

NOTE: D.C. currents shown are available from each tap.

ADJUSTABLE OUTPUT SERIES

Highly regulated, ripple-free power supplies. Adjustable through a screw-driver control on stud side of case.

HIGH CURRENT MODULES—
JA CASE, 3 3/4" x 3" x 4 7/8".

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
HCV-6	4.9-6.3	1.0 amp	0.2	0.20	\$105
HCV-10	8.5-11	1.0	0.2	0.10	105
HCV-12	11-13.5	1.0	0.25	0.10	105
HCV-15	13.5-17.5	0.8	0.25	0.20	110
HCV-20	18-22	0.6	0.25	0.30	115
HCV-28	26-30	0.5	0.25	0.30	115

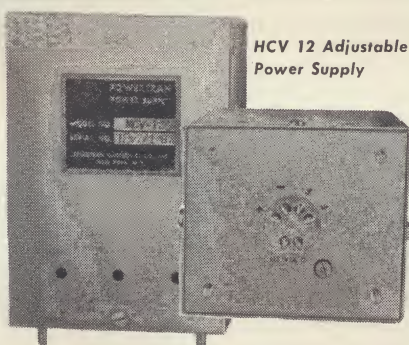
LOW CURRENT MODULES —
FB CASE, 2 1/4" x 2" x 2 1/2".

MR-6	5.5-7.5	50 ma.	2.0	0.10	\$55
MR-10	8.5-11	50	2.0	0.10	55
MR-12	11-13.5	50	2.0	0.12	55
MR-15	13-16.5	50	2.0	0.15	55

HIGH VOLTAGE SERIES

Featuring silicon solid-state rectification and regulation; floating outputs.

Model	D.C. Volts	D.C. Curr.	% Reg.	% Ripple	Case	Price
HV-75	75	60 ma.	1.5	.10	GA	\$60
HV-100	100	60	1.5	.10	GA	65
HV-150	150	45	1.0	.10	HA	75
HV-175	175	50	1.0	.10	HA	75
HV-200	200	40	1.0	.10	JB	80
HV-250	250	40	1.5	.10	JB	80
HV-300	300	30	1.5	.20	JA	90
HV-500	500	15	1.5	.30	KA	140
HV-750	750	10	1.5	.30	LA	180
HV-1000	1000	5	1.3	.30	LA	200



HCV 12 Adjustable Power Supply

SUB-MINIATURE SERIES

YY CASE, 1 5/8" x 1 3/4" x 1 5/8".

Model	D.C. Volts	D.C. Current	% Reg.	% Ripple	Price
SM-5	5.0	40 ma.	2.0	.60	\$40
SM-10	10.	40	2.0	.40	40
SM-12	12.	40	2.0	.40	40
SM-15	15.	40	2.0	.60	40
SM-20	20.	40	1.7	.60	45
SM-30	30.	30	2.5	.30	45

CONSTANT CURRENT POWER SUPPLIES

Supply a constant current despite variations in the load impedance from zero to 20K.

GB CASE, 2 3/4" x 2 3/8" x 2 1/4".

Model	D.C. Curr.	% Reg.	% Ripple	Price
CS-1	1.0 Ma.	2	0.1	\$50
CS-2	2.0	2	0.2	55

UNREGULATED SERIES

Model	D.C. Volts	D.C. Curr.	% Reg.	% Ripple	Case	Price
SU-6	6	2 amp.	—	—	HA	\$60
SU-10A	10	2	—	—	HA	60
SU-10B	10	.5	—	—	GA	60
SU-12A	12	1.5	—	—	HA	60
SU-12B	12	.5	—	—	GA	50
SU-12C	12	.25	—	—	GB	45
SU-15A	15	1.0	—	—	HA	60
SU-15B	15	.5	—	—	GA	50
SU-15C	15	.25	—	—	GB	45
SU-20A	20	.8	—	—	HA	60
SU-20B	20	.3	—	—	GA	50
SU-30A	30	.7	—	—	HA	60
SU-30B	30	.2	—	—	GA	45
SU-40A	40	.4	—	—	HA	50
SU-50B	50	.1	—	—	GA	40
SU-90	90	.25	—	—	JA	60
SU-120	120	.15	—	—	HA	50
SU-150	150	.11	—	—	HA	50
SU-200	200	.09	—	—	HA	50
SU-250	250	.065	—	—	HA	50

MILITARY SERIES

Meet MIL-E-5272-C specifications for shock, vibration, temperature, humidity and temp.-altitude. Silicon devices and tantalum capacitors used throughout.

MSM-5	5V.	50 ma.	1.5	—	EB	\$60
MSM-6	6	50	1.5	—	EB	60
MSM-10	10	50	1.0	0.7	EB	60
MSM-12	12	50	1.0	0.7	EB	60
MSM-15	15	45	1.5	1.0	EB	60
MSM-45	45	100	1.5	—	HA	75
MSV-100	100	40	1.5	—	GA	90
MS-242	{ 24	50	2.0	—	HB	150
	{ 12	80	1.5	—		
	{ 24	30	1.5	—		
MS-248	{ 12	30	2.0	—	HB	150
	{ 6.2	10	2.0	—		

AUDIO AMPLIFIER SYSTEMS

Model	Power Outp.	In-put Res. ohms	Out-put Res. Gain	Power Supply
MA-1 driving AA-1	125 mw.	50K	6 63 db	M-12
MA-1 driving AA-2L	100 mw.	50K	250 62 db	M-12
MA-1 driving AA-3-3	2 W.	50K	3 54 db	MCH-15
MA-1 driving AA-5H	2 W.	50K	3 76 db	MCH-15

RECOMMENDED POWER SUPPLIES

Amplifier	Ferrotran Power Supply Model No.
MA-1, AA-2, AA-2H, AA2L	M-12
AA-3-3 thru AA-6-3	MCH-15 or HCV-15

SOLID STATE AUDIO AMPLIFIER MODULES

Compact transistorized units designed to plug into any standard 7 or 8-pin socket. For P.A. or intercom systems, recorder or data amplifiers. Ruggedly constructed.

Model	Power Output	Input Res.	Output Res.	Gain	Dist.	Freq. Resp.	Coll. Volts	Coll. Curr.	Case Price
MA-1	—	50K ohms	2.2K ohms	24 db	2%	50 cps- 7 kc	+12V	2 ma.	** \$20
AA-1	150 mw	600 ohms	6 ohms	57 db	2%	400 cps- 8 kc	+12	40	FB 70
AA-2*	150 mw	13K ohms	6 ohms	63 db	3%	420 cps- 7 kc	+12	40	FB 75
AA-2H*	150 mw	40K ohms	6 ohms	56 db	4%	600 cps- 8 kc	+12	40	FB 75
AA-2L	135 mw	4700 ohms	600 ohms	44 db	1.5	180 cps-10 kc	+12	40	FB 70
AA-3-3	2 W	600 ohms	3.2 ohms	38 db	3%	140 cps- 8 kc	-15	260	HA 75
AA-3-8	2 W	600 ohms	8.0 ohms	36 db	4%	140 cps- 7 kc	-15	260	HA 75
AA-4-3	2 W	600 ohms	3.2 ohms	64 db	2%	210 cps-14 kc	-15	240	HA 115
AA-4-8	2 W	800 ohms	8.0 ohms	66 db	2.3	250 cps-13 kc	-15	240	HA 115
AA-4-3H*	2 W	15K ohms	3.2 ohms	65 db	2%	370 cps-10 kc	-15	240	HA 120
AA-5	2 W	800 ohms	3.2 ohms	63 db	3%	240 cps-14 kc	+15	220	HA 115
AA-5H	2 W	2.3K ohms	3.2 ohms	58 db	2.3	240 cps-14 kc	+15	220	HA 115

*Used with ext. input transformer supplied
**1 1/2" x 1 3/8" dia.

RECTIFIER TRANSFORMERS

FOR MINIATURE SOLID-STATE POWER SUPPLIES

A unique series of extremely small rectifier transformers with either a single or double secondary winding. Designed for use in transistor power supply packages. Channel-frame construction supplied. All units center-tapped. The listed ratings give output in a full-wave rectifier circuit with condenser input. POWER: 115 Volts, 60 to 400 cycles.

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SUB-MINIATURE SERIES

Channel-frame (1 3/8" L x 1 1/8" H x 1" W) or AH Case.

Model	Sec. D.C., V.	Sec. D.C., Curr.	Price
SM-1	10	80 ma.	\$10.00
SM-2	15	60	10.00
SM-3	20	50	10.00
SM-4	30	30	10.00

MINIATURE SERIES

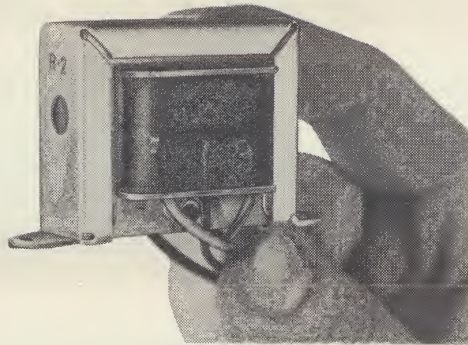
Channel-frame (1 5/8" L x 1 3/8" H x 1 1/8" W) or YY Case.

Model	Sec. D.C., V.	Sec. D.C., Curr.	Price
R-1	40	35 ma.	\$ 8.50
R-2	30	50	8.50
R-3	20	75	8.50
R-4	10	160	8.50
R-5	20, 20	50	11.50
R-6	15, 15	50	11.50
R-7	10, 10	75	11.50

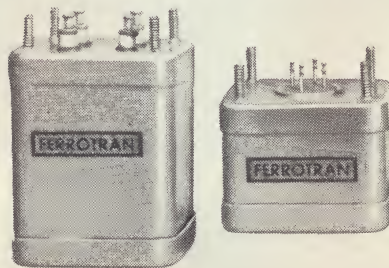
RELIABILITY

Since 1956, Ferrotran Electronics Co., Inc. has been a pioneer in the manufacture of miniaturized, solid state power supplies and other transistorized devices. The reliability of these products has been proven.

The components selected for these units are the finest available, assembled with skill and care; inspected with the most precise instruments; stocked in quantities which permit immediate delivery. TRY US TODAY!



ENCASED TRANSFORMERS



All the above listed Ferrotran Transformers are available encased. Add \$10 for single output MIL-T-27 encased units; \$12 for dual output units. Encased units feature hermetically sealed cans and compression-type multi-lead glass headers.

STANDARD SERIES

Channel-frame (2 1/4" L x 2" H x 1 5/8" W) or FB Case.

Model	Sec. D.C., V.	Sec. D.C., Curr.	Price
S-1	10	670 ma.	\$ 7.00
S-2	15	500	7.00
S-3	20	300	7.00
S-4	30	225	7.25
S-5	50	125	7.50
S-6	20, 20	150	11.00
S-7	15, 15	200	10.50
S-8	10, 10	300	10.00

INTERMEDIATE SERIES

Channel-frame (2" L x 1 5/8" H x 1 1/4" W) or AJ Case.

Model	Sec. D.C., V.	Sec. D.C., Curr.	Price
I-1	10	300	\$ 7.00
I-2	15	250	7.00
I-3	20	200	7.00
I-4	25	175	7.50
I-5	30	140	7.50
I-6	40	125	7.50
I-7	20, 20	125	11.00
I-8	15, 15	125	10.50
I-9	10, 10	150	10.00

HIGH CURRENT SERIES

Channel-frame (3" L x 2 1/2" H x 2" W) or GA Case.

Model	Sec. D.C., V.	Sec. D.C., Curr.	Price
H-1	10	2 amp.	\$ 7.50
H-2	15	1.3	7.50
H-3	20	1.0	7.50
H-4	30	0.7	8.00
H-5	40	0.4	8.00
H-6	20, 20	0.5	11.00
H-7	15, 15	0.7	10.50
H-8	10, 10	1.0	10.00
H-9	80	.225	8.50
H-10	100	.180	8.50
H-11	120	.150	8.50

NOTES: All Ferrotran Transformers will withstand a 1000 V., D.C. test voltage between each secondary winding. Nylon bobbins are used for additional voltage protection of the core. Insulating tissue is used between each winding.

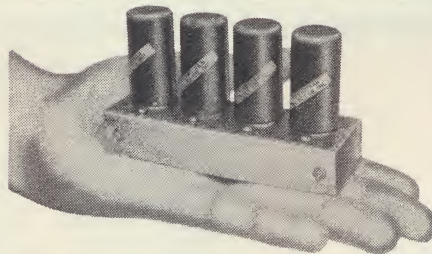
All units are available with an input of 115 V., 2000-cy. at small added cost. When used with a choke input filter, the output voltages given will be decreased by approx. 30%.

AMPLITRAN

TRANSISTOR I-F AMPLIFIER MODULES

A completely wired chassis is furnished with each cascaded unit and each Amplitran is adjusted to compensate for socket and stray wiring capacities. The overall size of a complete 4-stage I-F unit is 4 1/2" L x 1 1/4" W x 2 1/4" H.

Amplitran units may be obtained at frequencies intermediate to those listed. Dual and triple-stage cascaded units are also available. Input and output impedances may be obtained in accordance with customer specifications. Amplitran is tunable by means of a screwdriver adjustment accessible through a small hole in the top of the case. Cascaded units may, therefore, be stagger-tuned to produce wide banding. Connection diagrams and test data are provided with each unit shipped. An input test coil to match a generator or signal input stage is also supplied.



The Amplitran is a complete I-F stage in a 7-pin plug-in unit only 1-1/2" x 13/16" in dia. May be cascaded for complete I-F strip. Collector voltage: 9 volts.

SINGLE UNITS

Model	Ctr. Freq.	Bandwidth	Power Gain	Price
IF-1A	455 kc	10 kc	20 db	\$ 50
IF-2A	1 mc	60 kc	20 db	50
IF-3A	4.3 mc	800 kc	15 db	55
IF-4A	10.7 mc	900 kc	15 db	60
IF-5A	30.0 mc	0.4 mc	15 db	60

CASCADED UNITS

Model	Ctr. Freq.	No. of Stages	Bandwidth	Power Gain	Price
IF-1D	455 kc	4	10 kc	80 db	\$275
IF-2D	1 mc	4	15 kc	80 db	275
IF-3D	4.3 mc	4	600 kc	55 db	300
IF-4D	10.7 mc	2	500 kc	40 db	150
IF-5D	30 mc	4	1.8 mc	68 db	340

FERROTRAN ELECTRONICS CO., INC.

693 BROADWAY • NEW YORK, N. Y. 10012 • PHONE: 212—AL 4-5810

LABORATORY POWER SUPPLY FR SERIES

FEATURING ALL SILICON SEMICONDUCTORS; 0 TO 50 VOLTS AT 5, 10, AND 15 AMPERES; LOAD REGULATION — .01% OR 5 MILLIVOLTS, WHICHEVER IS GREATER; LINE REGULATION — .01%; RIPPLE — 500 MICROVOLTS (RMS MAXIMUM); TEMPERATURE RANGE — 0-50°C ADJUSTABLE CURRENT LIMITING.



DESCRIPTION

The FR Series of power supplies are used for laboratory and system applications where tight regulation, low ripple, and high stability are desirable features. They are furnished with output terminals at both front and rear locations for convenient use. The rear terminals have provisions for remote sensing. Conservative circuit design and component derating assure the utmost in reliability.

ELECTRICAL SPECIFICATIONS

Input Frequency: 50 to 60 CPS
(400 Cycles on request)
Input Voltage: 105 to 125 Volts
Regulation: .01% line, .01% load or
5 millivolts, whichever is greater
Ripple: 500 microvolts (RMS maximum)
Output Impedance: .001 at 1 KC
Recovery Time: 50 microseconds
Stability: .01% per °C
Operating Temperature: 0 to 50°C

MECHANICAL SPECIFICATIONS

19" rack mount; depth 15", Panel Size:
5 1/4" (5 Amp), 5 1/4" (10 Amp), 7" (15 Amp)

SINGLE UNIT PRICE

5 Amperes Model: \$395
10 Amperes Model: \$450
15 Amperes Model: \$565



ELASCO INCORPORATED
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